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ABSTRACT

Particular problems in the process of summative evaluation of document based information systems designed for educators are caused by a series of conditions of context factors of the evaluation. Some of these factors are identified and described. An evaluation plan is presented which recommends that the emphasis be shifted from initial definitions of objectives, benefits, and clients to increased emphasis on the identification of alternative information systems and the dissemination of its evaluation data. Examples from previous evaluation studies are presented to illustrate the problems as well as the recommended approach. (WCM)

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A MODEL FOR EVALUATING DOCUMENT BASED EDUCATIONAL INFORMATION SYSTEMS

ABSTRACT: Particular problems in the process of summative evaluation of document based information systems designed for educators are caused by a series of conditions of context factors of the evaluation. Some of these factors are identified and described. An evaluation plan is presented in which a shift in emphasis on the importance of initial definitions of objectives, benefits, and clients, and increased emphasis on the identification of alternate information systems and the dissemination of evaluation data, is recommended. Examples from previous evaluation studies are presented to illustrate the problems and the recommended approach.

INTRODUCTION

The general themes of the URISA Conference for this year have been identified in the Plenary Sessions as "Resources" and "Results". The study of the results of an information system, an activity that ultimately is tied to considerations related to resources for the establishment and maintenance of that system, is part of the concerns of a comprehensive evaluation study. Such an evaluation study of an information system would have to include activities designed to obtain information related to questions in three major categories. Questions in one category are concerned with the operational characteristics of the system. The evaluation plan must include provisions to identify, describe, and clarify the functions of various component parts of the system and determine the costs associated with these components. The second major category consists of questions related to the identification of the nature of the outcomes and objectives of the information system and the determination of the degree to which these objectives have been met. Finally, the evaluation plan would not be truly comprehensive unless information was provided so that judgments of the value of the objectives themselves, or the benefit of the information system, could be made.

Different groups have varying motives for seeking evaluation information. System managers are usually most concerned with the first category while system supports must direct their attention to questions of objective attainment and the resulting benefit. The terms "formative" and "summative" evaluation are often used in the field of education to distinguish between roles which evaluation must play, guiding system improvement and deciding about system acceptance. These roles often overlap and it is impossible to treat them as completely independent but the concern for examining results of an information system seems to dictate directing primary attention to summative evaluation.

This attention is necessary because even though there may be a trend, as described by Krevitt and Griffith, to focus on the effectiveness of information systems instead of on questions of ultimate value it also seems quite true, as these same authors have indicated, that the people who fund and support information systems are not going to be satisfied without some evidence of impact or results.[1] Similar comments appear frequently in the literature.[2]

EXAMPLES OF PREVIOUS EVALUATIONS

In order to clarify the problems which occur in educational information system evaluations four examples will be used throughout this paper. All four are related in some way to ERIC, Educational Resources Information Center, which is a national system designed to provide educators with access to educational literature. ERIC provides for monitoring, acquiring, evaluating, abstracting, and indexing documents representing current literature in education. In addition, ERIC sponsors information analysis activities and publications and dissemination projects designed to increase use of current knowledge. The system is built on a decentralized design in which clearinghouses handle all document processing activities. The entire system is coordinated and integrated in a central facility located within the National Institute of Education. In addition to acquiring and announcing documents, ERIC also supports a document reproduction service through which educators can obtain copies of non-copyrighted materials. The wide variety of types of documents in the system includes journal articles, research reports, conference proceedings, professional papers, innovative program descriptions, and bibliographies.

With such an extensive information system it would be unusual to find any single overall evaluation study. Instead, a few studies which have concentrated on certain parts of ERIC will be cited. One study, which examined ERIC products and services, was described in a report published in 1972 by Bernard Fry.[3] The objectives of the evaluation were relatively broad since there were many types of products examined. The major methods used in the study were questionnaries, site visits, and consultation with an advisory board. A second study, conducted by Judith Wanger and reported in 1972, was also concerned with the evaluation of products but in this study only

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[1]Krevitt, Beth I. and Griffith, Belver C. Evaluation of Information Systems: A Bibliography, 1967-1972. U.S., Educational Resources Information Center, ERIC Document ED 083988, December, 1973, p. 3.

[2]Cleverdon, Cyril W. Design and Evaluation of Information Systems. In Carlos A. Cuadra (Ed.) Annual Review of Information Science and Technology. Volume 6. (Chicago: William Benton, 1971), p. 68; see also Cooper, Michael D. The Economics of Information. In Carlos A. Cuadra (Ed.) Annual Review of Information Science and Technology. Volume 8. (Washington, D. C.: American Society for Information Science, 1973), p. 19.

[3]Fry, Bernard M. Evaluation Study of ERIC Products and Services, U.S., Educational Resources Information Center, ERIC Document ED 060922, March, 1972.

one type, information analysis products, was examined.[4] Questionnaires distributed to both a random and a nonrandom sample were used to determine ways the products are used, needs they meet, user satisfaction, and impact on educational practice. The third report differs from the preceding two in a number of ways. It is not a study in the same sense since no direct data gathering activities are described. Also, it was not commissioned by ERIC sponsors. The third report is an opinion paper written by William Paisley in which he examines ERIC and makes suggestions for changes in the system.[5]

The fourth evaluation study describes the results of the two year examination of the Pilot States Dissemination Program.[6] This program was set up in three states for a tryout period. The program had three major components. Two of these were an information retrieval center and staff located in the State Education Agency and field agents assigned to work with clients in designated target areas in order to assist in identifying problems, referring requests to the retrieval center, and delivering information back to the clients. Administration and management was the third component. The projects were relatively small with most states having two agents, three on the retrieval staff and one project director. The actual evaluation study was unusual in its concern not only for the evaluation but with the study of the evaluation process itself. The report contains much information both in the text and in the appendices related to methodology of evaluation in general and formative evaluation in particular. Questionnaires, tape recorded case studies, site visits, and shadow studies by field observers were some of the methods used in this investigation.

DIFFICULTIES IN SUMMATIVE EVALUATIONS

Performing a summative evaluation of any information system is difficult. Problems arise from at least six factors in the evaluation context. In addition, when these six factors all interact, as they often do in evaluations of document based information systems designed for educators, the difficulties are greatly compounded. The general factors of:

1. the nature of the information in the system

2. the uses to which this information is put by clients of the system

3. the nature of the organizational structure of the client's institution

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[4]Wanger, Judith. Evaluation Study of NCEC Information Analysis Products: Final Report. Volume I. Description of Study Methodology and Findings. U.S., Educational Resources.

[5]Paisley, William "Improving a Field-based "Eric-Like" Information System," Journal of the American Society for Information Science 22:399-408, November-December, 1971.

[6]Sieber, Sam D., Louis, Karen S., and Metzger, Loya The Use of Educational Knowledge, U.S., Department of Health Education, and Welfare (Washington, D. C.: Office of Education, 1972)

4. the ability to link means and objectives of the client's institution in causal chains

5. the assumptions about decision models on which the evaluation plan is formed

6. the state of development of the information system at the point of the summative evaluation

all impose special considerations for information system evaluation studies. Figure 1 presents a brief summary of the six context factors along with a few of the possible conditions for each factor.

Figure 1. Context Factors and Conditions In Information System Evaluations.

Context Factor	Conditions	
1. Nature of information	Data	Document
2. Information use	Decision	Awareness
3. Organizational structure	Defined	Diffuse
4. Linkage of means and objectives	Accepted	Questioned
5. Evaluation plan assumptions	Consistent with sponsor decision model	Inconsistent with sponsor decision model
6. Information system development	Established	Pilot

The broken line in Figure 1 connects the conditions which lead to the most severe problems in summative evaluations and the solid line connects conditions which are less threatening. The evaluation of any information system may be confronted with varying conditions of context factors but it is not unreasonable, in fact it is even quite common, for an educational information system evaluation to present the most severe case. The examples of evaluations of educational information systems presented in this paper all represent, with only slight variations on the last context factor, the right hand column of Figure 1.

Nature of Information

If an information system is based on retrieval and dissemination of documents rather than specific data, the determination of the benefit of the system becomes difficult due to considerations of the quality of the document. Documents represent the results of a considerable amount of summation, organization, and judgment by individuals other than the information system clients. Various investigators of the quality of published educational research reports have estimated the percent of

good reports to be between a low of seven percent and a high of thirty percent.[7] Even granting that the second figure is correct, the proportion is distressingly low. Information systems based on ERIC indexes, a major source in all of the examples, will face the problem of trying to determine whether any evidence of lack of benefit is due to a failure of the information system or inadequacy or error in retrieved documents. A data based system, such as a management information system, faces fewer sources of error in the transmitted information.

Information Use

Closely related to the question of the nature of the information in the system is the consideration of the uses to which the information will be put by the client. As an example of some of those uses Brittain, in a review of information studies investigating educational practitioners, lists direct incorporation in lectures, developing research projects, serving as a stimulus for thought, or serving as a basis for some direct action such as goal setting or decision making.[8] If information used for decision making can be related to a specific decision it will be possible to gain an idea of the benefit of the system being evaluated by seeking information about the decision outcome. This information can be used to make judgments of the benefits of the information system in terms of the benefits of the decisions. However, when information is used for increasing awareness, it is extremely difficult to attach any direct measure of benefit.

The extent to which the use of information for purposes other than actual decision making occurs in educational settings is quite high. For example, in the Wanger evaluation of ERIC products, the following conclusion is stated. "There is no clear evidence that information in products is used specifically in decision-making situations."[9] In the Pilot States evaluation a utilization index was developed in which one category represented the implementation of a specific practice or program resulting from efforts of the dissemination program. The average response rate in this category from the three states was eight percent. There was a higher response rate, approximately fourteen percent, for the category which represent use of information for planning which may have led to a rational decision of non-implementation, but this results was not clearly identified and it would be difficult to establish any benefit estimates from this data. Fry also found that a large ERIC client group was graduate students who used retrieved information for research projects, assignments, and term papers.[10] In summary, it seems that a common use of information by

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[7]Wandt, Edwin A Cross Section of Educational Research. (New York: David McKay, 1965), p. 3; see also Persell, Caroline H. "The Quality of Research on Education: An Empirical Study of Researchers and Their Work." (Doctoral dissertation, Columbia University, 1971).

[8]Brittain, J. M. Information and Its Users (New York: Wiley, 1970), pp. 111, 149.

[9]Wanger, p. 9.

[10]Fry, p. 2-3.

educators is to increase awareness and develop professional knowledge rather than to serve as a basis for a decision about implementation of a practice or program.

Organizational Structure

In cases where the organizational structure of the institution in which the client operates is very diffuse and decentralized with decision making occuring at many different levels, the problem of establishing benefit of information systems is increased. In such cases, it is difficult to even establish a concise definition of the client. Brown refers specifically to this problem when describing the evaluation of an interuniversity information network.[11] On different occasions the client may represent an individual, a committee, an organization, or even an institution. With this sort of ambiguity in client definition, an evaluator may never obtain data about the outcomes or benefit of an information system because of a simple failure to identify the appropriate source to investigate.

Linkage of Means and Objectives

In general, the questions of the relationship of means and ends and of the nature of causality are extremely complex and much has been written about these issues in philosophical literature. Certainly, these concepts are the subject of considerable debate and problems abound in their use. On the other hand, they are a definite part of common language and to ignore consideration of the issues they seem to imply in any social action program where there is competition for limited resources would seem to be inappropriate.

Society seems willing to establish points in what may be a very apparent longer means and ends chain as the designated goals of a given institution. These goals may not represent ultimate ends but they do mark a stage in an accepted causal chain leading to some more remote or ultimate end. In the case of educational institutions most of the designated goals have been defined in terms of behaviors which occur in some point of time after formal schooling has ended. In addition to the designation of goals, society also seems willing to accept student attainment of certain skills and knowledge as more immediate evidence of the accomplishments of the schools. The causal links between knowledge of the organization of government in a high school civics class and adult civic responsibility seem to be accepted if only to make some level of institutional accountability feasible. The degree of acceptance of a causal link is fluid and certain revisions are made when evidence from longitudinal studies become available but at an operational level definite causal links are accepted.

The designers of various subsystems in educational institutions must, in turn, either set objectives which are identical with those of the institution or, if there is some level of agreement about the existence of a causal link between the subsystem outputs and the institutional objectives, provision of these subsystem outputs can form the basis for evaluation. In either case, the evaluation of the subsystem is possible. However, when agreement about causal link is not present and the outputs of the subsystem are not identical with the institutional objectives, the evaluation process is much more difficult. This is a common case for educational information systems.

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[11] Brown, George W. An Interuniversity Information Network: II. Evaluation. In A. Kent and others (Eds.), Electronic Handling of Information: Testing and Evaluation. (Washington, D.C.: Thompson Book Company, 1967), p. 275.

In some cases, information systems are designed around objectives which are identical to those of the client's institution. This usually results in a disappointing assessment of the information system because it does not have much of a chance of demonstrating substantial benefit. We simply lack the ability to be able to adequately distinguish the effects of separate responsible factors when these are not independent. The best information system in the world will not appear very effective unless other responsible factors are also making their maximum contributions. For example, the main goal of the Pilot States Dissemination Program was to assist State Education Agencies to accelerate the improvement of educational practice and the installation of tested innovations and programs by local school districts.[12] Such a goal cannot be attained without coordinated assistance from many components, other than the information system, in the school district. As stated by Paisley:

> We could argue that ERIC accounts for no measurable change in educational practice across the United States. The arguement is unfair: people, not information systems, "do" education.[13]

Another approach consists of defining information system objectives in terms of output and operational characteristics of the system. For example, in the list of nine objectives stated for MEDLARS, which were used for several evaluation studies, none of the nine described client's institutional objectives.[14] All were related to operational characteristics of the system. Also, when listing the more specific objectives of ERIC both Paisley and Fry describe what seem to operational characteristics.[15] These include making documents accessible, preparing interpretive summaries, strengthen communication channels, develop a national information network, and bring the ERIC knowledge base to the attention of practitioners. When this sort of approach is used, impressive objective accomplishment can be demonstrated but summative decisions related to funding and support are weakened by the lack of evidence of benefit.

Evaluation Plan Assumptions

Most of the difficulties described so far will become very evident to information system managers if they interact with an evaluator who is using an evaluation plan designed under the assumptions of a comprehensive/prescriptive decision model. A detailed description of both this and the incremental/remedial decision model, as these function in educational settings, has been provided by Stufflebeam et. al.[16]

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[12]Sieber, Louis and Metzger, Appendix A.

[13]Paisley, p. 403.

[14]Stevens, Norman P. "MEDLARS: A Summary Review and Evaluation of Three Reports," Library Resources and Technical Services, 14:109-121, Winter, 1970.

[15]Paisley, p. 403; see also Fry, p. 1.

[16]Slufflebeam, D. L. and others, Educational Evaluation and Decision Making (Itasca, Illinois: F. E. Peacock Publishers, 1971), pp. 49-106.

and Schmidtlein.[17]

Most descriptions of evaluation approaches seem to be based on an implicit assumption that a comprehensive/prescriptive decision model is appropriate. The evaluator will begin by requesting the information system managers to supply the objectives of the system and to identify the client group. However, to those who function in settings where document information is used for awareness purposes, by clients who are difficult to identify, in an institution with diffuse decision making, concerning variables for which an accepted set of means and ends linkages does not exist, the fundamental organization of an approach represented by the evaluator, which is based on prior identification of ends, may be difficult to accept. Unless the evaluation plan more closely coincides with the assumption of an incremental/remedial decision model which itself seems to be more suited to the context conditions described so far, the conflict over the ability to supply objectives and client identification as inputs to the evaluation may result in both the evaluators and the system managers parting company with the conviction that the others are acting in a irrational fashion.

Information System Development

Finally, the problems faced by an information system evaluator are dependent upon the stage of development of the system during which the evaluation takes place. Although summative evaluation is undertaken to make a decision related to system acceptance, the past history of an information system can never be disregarded. When a pilot project is first begun the information system faces its most difficult period of evaluation. At this point a modern information system does not represent an incremental change in the schools. Since the system is new there are fewer organized advocacy groups to offer support and to enter into the conflict resolution process required in the incremental/remedial decision process. Concerns over benefits are high when a new system is being evaluated and less time is available for resolutions of issues related to the identification of these benefits.

Added to these problems is the increased emphasis on cost-benefit analysis caused in part by the general state of the economy. Cleverdon has identified 1970 as a major turning point in the level of financial support available for information systems and has indicated the impact of that change on evaluations. "Increasingly, those systems that are already established will have to justify the costs that they incur; proposals to establish new systems will be required to be subjected to a closer scrutiny."[18]

SUGGESTED CHANGES IN EVALUATION PLANS

In order to cope with the difficulties described, an evaluation approach is needed which is more capable of handling adverse context conditions. The following recommended changes in the design of summative evaluations for information systems may provide part of the answer.

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[17]Schmidtlein, Frank A. "Decision Process Paradigms In Education," Educational Researcher 3:4-10, May, 1974.

[18]Cleverdon, p. 67

Acceptance of Incompletely Stated Design Elements

One change that is needed is to develop an evaluation plan in which the identification of information system objectives, measures of benefit, and target or client group is accepted as part of the tasks to be accomplished during the evaluation. This identification should be viewed as an integral part of the evaluation itself rather than being demanded as initial inputs into the evaluation plan. This change of procedure may be required for the evaluation of other types of programs as well but it is certainly required for informaton systems because of our lack of the necessary knowledge. For example, in discussing what he calls "The Myths of Information Needs", Ely describes our present state of knowledge of the information needs of users as being inadequate for the purpose of specifying objectives for the design of information systems.[19]

The evaluation plan does not have to be completely open in its initial stages. There are some suggestions which can serve to identify objectives, benefit, and client groups and those who have initially proposed the informatin system will have some ideas related to these matters. For example, Lancaster's list of suggested measures of benefit seem quite appropriate for most information systems.

1. Cost savings in using thi system as compared with costs of finding needed information elsewhere.
2. Avoidance of loss of productivity (of, for example, engineers) that would result if information sources were not readily available.
3. Improved decision-making or reduction in the level of personnel required to make decisions.
4. Avoidance of duplication or waste of engineering or research efforts on projects that have either been done before or that have proved infeasible by earlier investigations.
5. Stimulation of invention (a serendipity factor).[20]

To this list other suggested measures of benefit could be added. For example, the amount a client would be willing to pay for information and the amount of time a person is willing to spend at information gathering activities, have been advocated by Herring et al.,[21] Vickery,[22] and Grotterer.[23] The evaluation of the Pilot States

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[19]Ely, Donald P. "The Myths of Information Needs", Educational Researcher 2:1 -17, April, 1973.

[20]Lancaster, p. 250.

[21]Herring, Conyers and others, Report of the Panel on Economics of the Science Information Council. U.S. National Science Foundation, Washington, D.C., February, 1973 as cited in Michael Cooper, The Economics of Information. In Carlos A. Cuadra (Ed.) Annual Review of Information Science and Technology. Volume 8 (Washington, D.C.: American Society for Information Science), 1973, p. 19.

[22]Vickery, B. C. "Research by ASLIB Into Costing of Information Services", Aslib Proceedings 24:337-341, June, 1972.

[23]Grotterer, Malcolm H. Identification of Performance Criteria of An Electronic Information System. In A. Kent and others, pp. 51-62.

project used several measures of benefit which seem very promising. These included measures of the frequency with which clients talked to others about retrieved information, gave or shared copies of retrieved information to others, or recommended the information system services to others.[24] Wanger's evaluation of ERIC products also included measures of the extent to which clients shared information with others and, another possible measure of benefit, the extent to which clients were stimulated to seek further information.[25]

In the Pilot States evaluation there is mention made of the lack of clear goals available at the beginning of the project. However, the solution advocated to this problem, both in the report itself and in the position paper included as Appendix I, does not seem adequate. The recommendation made in the study is that consultations with program directors and staff along with deductive conclusions derived from an examination of literature about the program can be used to determine goals and objectives. These can also be put into some form of checklist for consideration by the system managers.[26] These suggestions are certainly valuable and were used well in the report but they serve best only for initial stages of the evaluation. Also, the discussion of goal determination presented in the Pilot States report seems to place emphasis on the necessity of this type of work only in the initial stages. At another point in the report the statement is made that an additional step in the information transfer process, that of screening, was identified later in the project and would have been, if it had been anticipated, included in the objectives checklist.[27] What these comments seem to indicate is the need for an evaluation design which uses all the methods described along with direct observation of the output and effects of the information systems and activities of clients in order to formate goals and objectives throughout the evaluation process. This should be included in a formal way into the evaluation plan so that initial uncertainty about goals and objectives is not treated as an undersirable weakness in the program.

Regardless of how much initial information may be available, the evaluation plan should be set up so that data gathering activities are specifically included to obtain information about the abilities and resources which the information system actually creates in the client's institution. Data gathering activities will be needed to actually identify clients and the uses which are made of information. Since these activities cannot be expected to occur in the initial stages of a study this sort of approach may require more use of retrospective measures, which have many weak points, but even a weak measure of an important outcome is better than no measure.

In addition the evaluation plan should provide for activities designed to gather data to decide whether or not it will be possible to link the observed system outputs and information uses of clients with any prespecified objectives which may have been included as initial input into the evaluation study. For example, some restrictions must be put on the form of objectives which are eventually set to guide a summative decision to prevent these objectives from becoming identical with the overall institutional objectives unless it is possible to separate out the effects of any other institutional subsystem or input. Or, if these objectives are retained for some

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[24]Sieber, Louis and Metzger, p. 526.

[25]Wanger, p. 8.

[26]Sieber, Louis and Metzger, Appendix I. [27]Sieber, Louis and Metzger, p. 52.

political reason the evaluation plan will have to be modified to include measures of the other relevant input factors so that at least some sort of regression analysis will be possible.

All of these considerations involving observation, analysis, and reformulation of the evaluation design, will result in a lot of activity which more traditional evaluation plans presume is complete before the actual evaluation study begins. What is required in the approach advocated here is more of a willingness to accept incomplete elements of the plan initially and to provide activities to fill in more specific detail.

Linking Formative and Summative Variables

After a reassessed and expanded set of objectives are available, the evaluation plan should provide for activities designed to gather information needed to link the variables selected for formative purposes with the variables implied by the system objectives. Earlier in this paper it was stated that the concerns of formative and summative evaluation are distinct but related. They are related in that unless some evidence of linkage exists between the aspects of the system examined for formative purposes and the variables chosen as indicators of output for summative purposes the former would have to be dropped from the evaluation plan. Since objectives used for summative purposes won't be formed at the initial stages of the evaluation, there should be a stage specifically included where evidence will be sought and used to judge the extent to which satisfactory performance on formative variables contributes to attainment of the reformulated information system objectives. Once again, it is necessary to consider an evaluation approach in which there is tolerance for initial vagueness in defining variables for study.

Lancaster has recommended factors which seem suitable for an initial set of formative concerns so that the evaluation plan is not completely lacking in direction. These factors include coverage, recall, precision, response time, user effort, and form of the retrieved information.[28] Of these variables coverage and recall are not examined very extensively in any of the four examples of evaluation reports but there is frequent mention of precision. The form of the retrieved information has also been a frequent concern with attention being directed to writing style and organization by Wanger and the physical form of document reproductions with microfiche discussed by Paisley.[29] In future studies some of the listed factors may serve well but it is possible that not all will be relevant due to some characteristic of education practitioners. For example, the role of response time is in some question. In the Pilot State evaluation it was reported that:

> ...the main conclusion to be drawn from these data is that longer turnaround in itself does not reduce utilization, although it might create dissatisfaction in the absence of a field agent.[30]

A variable which is often used in evaluations of educational information systems but which is not included in the list previously mentioned is that of user knowledge of or familiarity with the information system. A logical argument is usually made to establish a link between use of the system, which is related to

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[28]Lancaster, p. 235.

[29]Wanger, Volume II; see also Paisley, pp. 404-405.

[30]Sieber, Louis and Metzger, p. 562.

benefit, and knowledge of the system. The argument is presented that knowledge of the system is a logical condition of necessity but not sufficiency with respect to use of the system. Paisley uses this variable as a basis for his analysis of ERIC and claims that studies of knowledge of ERIC among educators show a failure to reach a wide audience.[31] Fry's study indicates a greater degree of knowledge of ERIC and Wanger's evaluation indicates 72 percent of a random sample report familiarity with ERIC products.[32] The difference in the point of development of ERIC may explain these different results but with even the most favorable figures the strength of support offered for a summative decision is reduced by the lack of evidence of relation between familiarity and some benefit related impact.

Identification of Alternate Systems

Once an accepted set of system objectives are available, the evaluation plan should provide activities designed to identify alternate information systems already in place in the client's institution which have similar outputs as those described in the objectives list. Once true alternate systems are specified, then components must be identified. Finally, the evaluation plan must provide data about costs associated with these components.

The reason for these activities seems clear. Summative evaluation or justification of continued funding of a program is contingent upon being able to identify good programs. Since in general, school districts attempt to reach specified outputs at minimum costs, desirable programs are one which offer greater benefit for similar costs or the same benefit at lower costs.[33] All of these comparisons require the identification of alternate systems.

This requirement will probably be difficult to meet. In describing the results of surveys made of specialized information centers Kent has indicated that most were not aware of cost information for components of their own operations.[34] Similar comments were made at a later date by Lancaster and Gillespie[35] and Stephens.[36]

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[31]Paisley, p. 403

[32]Wanger, p. VIII-2.

[33]Bruno, James E. "A Methodology for the Evaluation of Instruction or Performance Contracts Which Incorporates School District Utilities and Goals", American Educational Research Journal 9:175-196, Spring, 1972.

[34]Kent, Allen Specialized Information Center (Washington, D.C.: Spartan Book), 1965.

[35]Lancaster, F. W. and Gillespie, C. J. Design and Evaluation of Information Systems. In Carlos A. Cuadra (Ed.), Annual Review of Information Science and Technology. Volume 5 (Chicago: William Benton), 1970, pp. 33-70.

[36]Stephens, p. 121.

Of the four evaluations described in this paper only one mentions alternate systems and in this one case there is no attempt made to provide extensive comparitive information. In the Pilot State Dissemination Project evaluation the output of the information system was considered comparable with that provided by consultants from the State Education Agency. In comparing the two the following conclusion was reached.

> In the first place, field agents can perform the job of helping clients at the local level better than consultants--as shown by our survey data.[37]

No further information was provided about cost for both of these systems or about the existence of noncomparable outputs so no judgment about the most cost effective system to support could be reached in this case but such comparisons seem essential.

It is also possible that this activity will stir up hostility resulting from feelings of threat among individuals associated with alternate systems. This may be unavoidable and certainly is accepted and accomodated in the rationale of the incremental/remedial decision model. However, if the evaluation plan does not have all of the features recommended in this paper the alternate system supporters may have a clear and unfair advantage over the supporters of the new information system because of their greater organization.

Provision for Dissemination of Evaluation Data

To counter the advantage of organized groups associated with existing alternate system, the plan for the evaluation of a new information system should include specific activities for the dissemination of evaluation data. This process is essential if there is to be a greater degree of consistency between the design of the evaluation study and the decision model of the client institution in cases where an incremental/remedial model is appropriate. The rationality of this decision model is based on assumptions of conflict management involving negotiation and bargaining among members of informed self interest groups. The formation of these informed groups is dependent on systematic and comprehensive dissemination of evaluation information which must occur at all stages of the evaluation process. It is not enough to prepare a final report which will be turned over to those who commissioned the study. Members of the educational community who are affected by the final summative decisions need to not only have access to evaluative data but they need to be alerted to the existence of this data. They need to be as aware of the evaluations as they are of the information systems.

CONCLUSIONS

Summative evaluation is not often popular because of the final nature of the activity. Perhaps educators are more reluctant than other groups to accord summative evaluation a respected status since so much of the literature in the field of education has stressed the importance of the development of individual potential and a high level of dedication to finding ways to reach students or improve programs. All of the examples reported in this paper have been extensively directed to formative

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[37] Sieber, Louis and Metzger, p. 549.

evaluation even though program funding decisions have been frequent. When considering the fact that such decisions have been made it is very difficult to understand the almost complete lack of a comparative evaluation of alternate information systems which include some of the newer and some of the more established methods of serving the needs of educational practitioners. This lack of data becomes very apparent when resources are sought to establish an information system.

Competition for scarce resources will probably always be an element affecting program design and evaluation in education. The interests of no group will be served well if poor decisions are made and resources are spent on ineffective programs. However, at present it is very doubtful whether or not an innovative information system designed for educators has much of a chance competing for funds even if it is effective because of the way evaluations are traditionally structured. Some accomodations have to be made in the evaluation design and more conscious attention must be given to formal summative evaluation if this situation is to change. The recommended changes presented in this paper may be a step in that direction.